

Attorney Docket No.: F7752(V)  
Serial No.: 10/583,421  
Filing Date: June 19, 2006  
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**REMARKS**

***Amendments to the Claims***

Claim 1 has been amended without prejudice and new claims 19-24 introduced to recite preferred embodiments of applicants invention that are more clearly differentiated from the prior art.

Amended claim 1 specifies that the coating includes a covalently cross-linked biopolymer selected from the group consisting of sugar beet pectin having chemically attached feruoylated glycerides, and chitosan having covalently coupled vanillin groups and chemically attached feruoylated glycerides; (page 6, lines 15-16, page 10, lines 1-4; and page 13, lines 24-25 and page 14, lines 17 to page 15, line 3).

New claim 19 specifies that the feruoylated glycerides recited in claim 1 comprises glycerol moieties containing one or two fatty acid chains (page 10, lines 7-10).

New claim 20 specifies that the feruoylated glycerides recited in claim 1 is made by the reaction of a triglyceride, a ferulate and lipase (page 12, line 32 to page 13, line 2).

New claim 21 specifies that the lipid material recited in claim 1 is an edible fat (page 7, line 16).

New claim 22 specifies that the lipid material recited in claim 1 is an edible fat selected from the group consisting of sunflower oil, coconut oil, rapeseed oil, olive oil, peanut oil and combinations thereof (page 7, lines 16-20).

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New claim 23 specifies that the covalently cross-linked biopolymer is chitosan having covalently coupled vanillin groups and chemically attached feruoylated glycerides (original claim 1).

New claim 24 specifies that the covalently cross-linked biopolymer is sugar beet pectin having chemically attached feruoylated glycerides (original claim 1).

Claim 16 -18 are hereby canceled without prejudice.

### ***Claims Objection***

Since claim 18 has been canceled the objection raised by the Examiner is rendered moot.

### ***Claim Rejections – 35 USC § 103***

Claims 1, 6-7 and 16 were rejected under 35 USC §103(a) as being unpatentable over Nishiura et al (JP 05-168401A) in view of Mazzarelli (G2272447) as further evidenced by Hall et al (US 4424346 and further in view of Ninomiya et al (US5089307) and Franzoni (US 5077052). Applicants respectfully traverse this rejection.

Nishiura is directed to a surface-treating agent containing ethanol, a coating agent, an antibacterial agent and water (abstract).

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Pectin is mentioned as one of the alternative biopolymer coating agents that may be used.

Nishiura teaches that *antibacterial agents* in the coating can include glycerin mono fatty acid ester such as such as caprylic (C8), capric (C10) and lauric (C12) esters.

Nishiura is silent regarding cross-linking of any coating agent, of any biopolymer having chemically attached feruoylated glycerides, and of coatings that include a lipid material which is an edible oil, fat or wax as these terms are construed from applicant's specification.

Mazzarelli is directed to a polymeric product which is the reaction product of a) chitosan with b) a methoxyphenyl-containing aldehyde, ketone or acid (preferably in solution form) preferably derived from a natural product; the natural product preferably having a molecular weight of at least 10,000 and preferably being derived from lignin, e.g. veratraldehyde, salicyaldehyde, vanillin, syringaldehyde, etc. The product is film-forming and can be used in packaging (abstract).

Mazzarelli is silent regarding coatings that include pectin, cross-linked sugar beet pectin, any biopolymer having chemically attached feruoylated glycerides, and of coatings that include a lipid material which is an edible oil, fat or wax.

Hall is directed to derivatives formed from chitins and chitosans in which the amine residues on the polyglucosamine have been modified to form the groups: (a) -N=CHR or -NHCH<sub>2</sub> R (b) --NHR' (c) --NHR" and (d) -NH-CH<sub>2</sub>CO<sub>2</sub>H or --NH--glyceryl where R is an aromatic moiety having at least one hydroxyl or carboxyl group, or a macrocyclic ligand R' is an aldose or ketose residue, and, R" is an organometallic aldehyde residue. These derivatives are useful in chelating metals, in pharmaceutical

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formulations, in cosmetics, in chromatographic separations, in enzyme immobilization, as catalysts, etc. Galactomannans having selected amine-containing side chains have also been prepared by reductive amination (abstract).

Hall is silent regarding coatings that include pectin of any type, any crosslinked biopolymer having chemically attached ferooylated glycerides, and of coatings that include a lipid material which is an edible oil, fat or wax.

Ninomiya discloses heat-sealable edible films comprising at least a film layer containing a water-soluble polysaccharide as the principal component, or comprising at least (a) a film layer as described above and (b) a subfilm layer containing an alkali metal salt of casein, soybean protein or a combination of soybean protein and gelatin, as the principal component. Preferably, the water-soluble polysaccharide is composed chiefly of carrageenan and the film layer additionally contains a polyhydric alcohol. These edible films are useful in sealing or packaging powdery foods, granular foods, dry solid foods, oily foods and the like (abstract).

"Ninomiya teaches that the polysaccharides which can be used in the invention include, alginic acid and its salts such as sodium salt; furcellaran; carrageenan such as kappa-, iota- and lambda-carrageenans; agar; *pectin* such as high-methoxy and low-methoxy pectins; gums such as tamarind seed gum, xanthan gum, guar gum, tara seed gum, locust bean gum and arabinogalactan; pullulan; chitin derivatives such as chitosan; starch such as wheat, corn and potato starches; dextrin; edible water-soluble cellulose derivatives such as carboxymethylcellulose; and mixtures of the foregoing". Ninomiya further teaches that *from the viewpoint of film-forming properties, film properties and the like, it is preferable to use one or more polysaccharides selected from alginic acid and its salts, furcellaran, carrageenan and agar* (abstract emphasis added).

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Ninomiya is silent regarding coatings that include cross-linked biopolymer having chemically attached feruoylated glycerides, and of coatings that include a lipid material which is an edible oil, fat or wax.

Franzoni is directed to specific organosoluble derivatives of chitosan, useful in coating biologically active feedstuff additives intended for ruminants, to provide coatings which are stable at a pH greater than 5 and which release the biologically active substance at a pH below 3.5 (abstract).

Franzoni is silent regarding coatings that include pectin, chemically cross-linked biopolymers having chemically attached feruoylated glycerides, and of coatings that include a lipid material which is an edible oil, fat or wax.

In contrast applicants' claim 1 is directed to edible barrier suitable for use in food products which includes a covalently cross-linked biopolymer selected from the group consisting of sugar beet pectin having chemically attached feruoylated glycerides and chitosan having covalently coupled vanillin groups and chemically attached feruoylated glycerides; and a lipid material. The edible barrier has a thickness of about 2 to 1,500 micrometer and the lipid material is an edible oil, fat or wax.

To qualify as a 103(a) reference "The prior art reference, or combination of references, must teach or suggest all of the claim limitations (MPEP §2143). In addition to providing at least a suggestion of all the claim limitations, both the suggestion and the reasonable expectation of success must be found in the prior art references, not in Appellant's disclosure" (See *In re Vaeck*, 20 U.S.P.Q.2d 1438, 947 F.2d 448 (Fed Cir. 1991)).

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Applicants respectfully submit that the combination of Nishiura, Mazzarelli, Hall, Ninomiya and Franzoni does not teach or suggests a coating comprising a covalently cross-linked sugar beet pectin having chemically attached feruoylated glycerides or chitosan having covalently coupled vanillin groups and chemically attached feruoylated glycerides, and a lipid material which is an edible oil, fat or wax. Absent a disclosure of these elements either explicitly or implicitly, the references can not present a *prima facie* case of obviousness over claim 1.

Applicants further submit that claims 19-22 are even further removed from the combination of references because these claims recite additional elements not taught or suggested individually or in combination.

Claim 19 specifies that the feruoylated glycerides contains glycerol moieties containing one or two fatty acid chains whereas the references are silent regarding feruoylated glycerides.

Claim 20 specifies that the feruoylated glycerides is made by the reaction of a triglyceride, a ferulate and lipase whereas the references are silent regarding feruoylated glycerides and any process to make them.

Claim 21 specifies that the lipid material is an edible fat whereas the references are silent regarding edible fats without triglycerides, as a specific component of a coating.

Claim 22 specifies that the lipid material is an edible fat selected from the group consisting of sunflower oil, coconut oil, rapeseed oil, olive oil, peanut oil and combinations thereof whereas the references are silent regarding any edible fat as a specific component of a coating.

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In view of the above amendments and remarks, applicants respectfully request that the §103(a) rejection of claims 1, 6-7 and 16 over the combination of Nishiura, Mazzarelli, Hall, Ninomiya and Franzoni be reconsidered and withdrawn.

**Claims 17 and 18 were rejected under 35 USC §103(a) as being unpatentable over Nishiura et al (JP 05-168401A) in view of Mazzarelli (G2272447) as further evidenced by Hall et al (US 4424346 and further in view of Ninomiya et al (US5089307) and Franzoni (US 5077052) and further in view of Heilemann et al WO2001004207.**

Claims 17-18 have been canceled thereby rendering the 103(a) rejection moot.

**Claims 1, 6-7 and 16 were rejected under 35 USC §103(a) as being unpatentable over Iverson et al (US 20030203084) in view of Mazzarelli (G2272447) as further evidenced by Hall et al (US 4424346 and further view of Ninomiya et al (US5089307) and Franzoni (US 5077052). Applicants respectfully traverse this rejection.**

Iverson discloses that a virgin chitosan polymer is added to an acid and water solution in an amount sufficient to form an edible composition having a solids content greater than five percent (5%) and a liquid viscosity. The composition is applied to food products, such as fruits, vegetables and nuts, to provide an edible protective coating for the food products. Alternatively, chitosan may be hydrolyzed to a lower molecular weight so that a gel will not be formed when the partially hydrolyzed chitosan is admixed to the acid water solution. An edible wax emulsion and/or a preservative such as sodium benzoate, and/or an adhesion additive such as zinc acetate, and/or a wetting

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agent, and/or one or more additives from the group consisting of virgin and/or modified carbohydrates, proteins, hydrocolloides, lipids, oils, gums and waxes, natural and/or synthetic, made be added to the composition before it is applied to the food product. In a preferred form, a chitosan polymer is used that has a molecular weight sufficient to form a composition having a solids content of about fifteen percent (15%) or higher (Abstract).

Iverson is silent regarding feruoylated glycerides and coatings including any biopolymer having chemically attached feruoylated glycerides.

Iverson is also silent regarding edible fats as an essential part of a coating.

Mazzarelli, Hall, Ninomiya and Franzoni have already been discussed above.

In contrast applicants' claim 1 is directed to an edible barrier suitable for use in food products which includes a covalently cross-linked biopolymer selected from the group consisting of sugar beet pectin having chemically attached feruoylated glycerides and chitosan having covalently coupled vanillin groups and chemically attached feruoylated glycerides; and a lipid material. The edible barrier has a thickness of about 2 to 1,500 micrometer and the lipid material is an edible oil, fat or wax.

To qualify as a 103(a) reference "The prior art reference, or combination of references, must teach or suggest all of the claim limitations (MPEP §2143). In addition to providing at least a suggestion of all the claim limitations, both the suggestion and the reasonable expectation of success must be found in the prior art references, not in Appellant's disclosure" (See *In re Vaeck*, 20 U.S.P.Q.2d 1438, 947 F.2d 448 (Fed Cir. 1991)

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Applicants respectfully submit that the combination of Iverson, Muzzarelli, Hall, Ninomiya and Franzoni does not teach or suggests at least a coating comprising a covalently cross-linked sugar beet pectin having chemically attached feruoylated glycerides and chitosan having covalently coupled vanillin groups and chemically attached feruoylated glycerides . Absent a disclosure of these elements either explicitly or implicitly, the references can not present a *prima facie* case of obviousness over claim 1.

Applicants further submit that claims 19-22 are even further removed from the combination of references because these claims recite additional elements not taught or suggested individually or in combination.

Claim 19 specifies that the feruoylated glycerides contains glycerol moieties containing one or two fatty acid chains whereas the references are silent regarding feruoylated glycerides.

Claim 20 specifies that the feruoylated glycerides is made by the reaction of a triglyceride, a ferulate and lipase whereas the references are silent regarding feruoylated glycerides and a process to make them.

Claim 21 specifies that the lipid material is an edible fat whereas the references are silent regarding edible fats, which are triglycerides, as a component of a coating.

Claim 22 specifies that the lipid material is an edible fat selected from the group consisting of sunflower oil, coconut oil, rapeseed oil, olive oil, peanut oil and combinations thereof whereas the references are silent regarding any specific edible fat as a component of a coating.

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In view of the above amendments and remarks, applicants respectfully request that the §103(a) rejection of claims 1, 6-7 and 16 over the combination of Iverson, Mazzarelli, Hall, Ninomiya and Franzoni be reconsidered and withdrawn.

Claims 17 and 18 were rejected under 35 USC §103(a) as being unpatentable over Haugaard in view of Mazzarelli (G2272447) as further evidenced by Hall et al (US 4424346 and further in view of Ninomiya et al (US5089307), Iverson et al (US 20030203084) and Franzoni (US 5077052).

Claims 17-18 have been canceled thereby rendering the 103(a) rejection moot.

Claims 1, 6-7 and 16 were rejected under 35 USC §103(a) as being unpatentable over Haugaard in view of Mazzarelli (G2272447) as further evidenced by Hall et al (US 4424346 and further view of Ninomiya et al (US5089307), Iverson et al (US 20030203084) and Franzoni (US 5077052). Applicants respectfully traverse this rejection.

Haugaard is a review article on the state of the art on the use of biobased packaging materials in food applications,

Haugaard mentions pectin in Table 2 spanning pages 196-198 and entitled "Potential food applications using biobased packaging and edible films/coatings". However, Haugaard is silent regarding cross-linked pectin, ferooylated glycerides and a coating that includes any biopolymer having chemically attached ferooylated glycerides.

Mazzarelli, Hall, Ninomiya, Iverson and Franzoni have already been discussed.

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In contrast applicants' claim 1 is directed to an edible barrier suitable for use in food products which includes a covalently cross-linked biopolymer selected from the group consisting of sugar beet pectin having chemically attached feruoylated glycerides and chitosan having covalently coupled vanillin groups and chemically attached feruoylated glycerides; and a lipid material.

To qualify as a 103(a) reference "The prior art reference, or combination of references, must teach or suggest all of the claim limitations (MPEP §2143). In addition to providing at least a suggestion of all the claim limitations, both the suggestion and the reasonable expectation of success must be found in the prior art references, not in Appellant's disclosure" (See *In re Vaeck*, 20 U.S.PQ.2d 1438, 947 F.2d 448 (Fed Cir. 1991).

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Applicants respectfully submit that the combination of Haugaard, Mazzarelli, Hall, Ninomiya, Iverson and Franzoni does not teach or suggests at least a coating comprising a biopolymer selected from the group consisting of a cross-linked sugar beet pectin having chemically attached feruoylated glycerides and chitosan having covalently coupled vanillin groups and chemically attached feruoylated glycerides; and a lipid material. Absent a disclosure of this element either explicitly or implicitly, the collection of 6 references can not present a *prima facie* case of obviousness over claim 1.

Applicants further submit that claims 19, 20 and 22 are even further removed from the combination of references because these claims recite additional elements not taught or suggested individually or in combination.

Claim 19 specifies that the feruoylated glycerides contains glycerol moieties containing one or two fatty acid chains whereas the references are silent regarding feruoylated glycerides.

Claim 20 specifies that the feruoylated glycerides is made by the reaction of a triglyceride, a ferulate and lipase whereas the references are silent regarding feruoylated glycerides and any process to make them.

Claim 22 specifies that the lipid material is an edible fat selected from the group consisting of sunflower oil, coconut oil, rapeseed oil, olive oil, peanut oil and combinations thereof whereas the references are silent regarding any of these specific triglycerides as a specific component of a coating.

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In view of the above amendments and remarks, applicants respectfully request that the 103(a) rejection of claims 1, 6-7 and 16 over the combination of Haugaard, Muzzarelli, Hall, Ninomiya, Iverson and Franzoni be reconsidered and withdrawn.

Claims 17 and 18 were rejected under 35 USC §103(a) as being unpatentable over Haugaard in view of Muzzarelli (G2272447) as further evidenced by Hall et al (US 4424346 and further view of Ninomiya et al (US5089307), Iverson et al (US 20030203084) and Franzoni (US 5077052) and further in view of Heilemann et al WO2001004207.

Claims 17-18 have been canceled thereby rendering the 103(a) rejection moot.

#### **Regarding new claim 23 and 24**

Claim 23 recites and edible barrier suitable for use in food products, comprising a covalently cross-linked chitosan having covalently coupled vanillin groups *and chemically attached feruoylated glycerides*; and a lipid material, said edible barrier having a thickness of about 2 to 1,500 micrometer wherein said lipid material is an edible oil, fat or wax.

Claim 24 recites and edible barrier suitable for use in food products, comprising a covalently cross-linked sugar beet pectin having chemically attached feruoylated glycerides *and chemically attached feruoylated glycerides*; and a lipid material, said edible barrier having a thickness of about 2 to 1,500 micrometer wherein said lipid material is an edible oil, fat or wax.

Applicants have already discussed that none of the references cited alone or in combination disclose chemically attached feruoylated glycerides to any covalently cross-

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linked biopolymer. Consequently, none of the references alone or in combination render claim 23 or 24 obvious under §103(a) at least because none of the references alone or in combination teaches or suggests the recited covalently cross-linked biopolymer having chemically attached feruoylated glycerides.

In view of the foregoing amendment and remarks, applicants respectfully request that the application be allowed to issue.

If a telephone conversation would be of assistance in advancing prosecution of the subject application, applicants' undersigned agent invites the Examiner to telephone him at the number provided.

Respectfully submitted,

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